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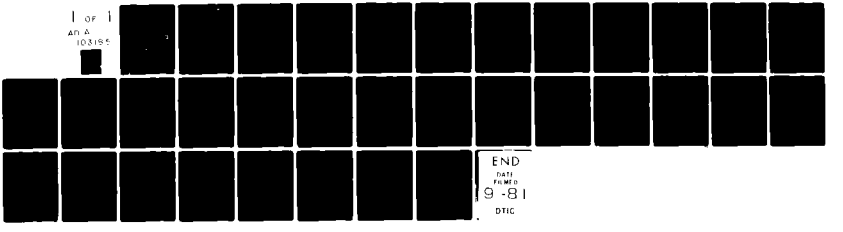

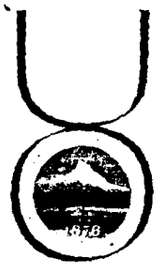

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Extension of the Schmidt and Hunter Validity Generalization Procedure to the Prediction of Absenteeism Behavior from Knowledge of Job Satisfaction and Organizational Commitment

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Research would suggest that the relationship between job satisfaction and absenteeism is weak and inconsistent. The present study examines whether this might be explained from statistical artifacts following the validity generalization procedure developed by Schmidt and Hunter. Data on absenteeism, satisfaction and commitment were collected from 242 employees in six retail stores. Evidence of differences across stores were demonstrated. When statistical artifacts were controlled, little variablility in validities remained. Application of the Schmidt and Hunter procedure to other attitude-behavior topics is discussed

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Extension of the Schmidt and Hunter Validity Generalization Procedure to the Prediction of Absenteeism Behavior from Knowledge of Job Satisfaction and Organizational Commitment

Situational specificity of test validities is a common finding in employee selection research. Failure to demonstrate generalizability across studies when similar tests are used to predict performance in similar jobs implies that empirical validation must be demonstrated each time the test is used (Guion, 1965).

Frank Schmidt and John Hunter have challenged this belief. In a series of studies they have demonstrated that a substantial amount of variation in test validities can be explained when statistical artifacts are considered (Schmidt, Hunter & Urry, 1976; Schmidt & Hunter, 1977; Schmidt & Hunter, 1978; Schmidt, Hunter, Pearlman & Shane, 1979; Schmidt, Gast-Rosenberg & Hunter, 1980; Pearlman, Schmidt & Hunter, 1980; Schmidt, Hunter & Pearlman, 1981). Sources of error identified by Schmidt and Hunter (1977) that can contribute to the appearance of situational specificity are: (a) criterion unreliability, (b) predictor unreliability, (c) range restriction, (d) sampling error due to small N's, (e) computation and typographical errors, (f) criterion contamination and deficiency, and (g) slight differences in factor structures between different tests thought to measure similar constructs. If variation in observed validities drops to zero or near zero after variation due to the above artifacts has been removed, then the hypothesis of situational specificity is rejected. Application of Bayesian statistical methods to existing validities allows for inferences concerning the validity of the test in future settings.

Hunter and Schmidt (1978) have drawn comparisons between their statistically based validity generalization model and a conceptually based data analytical

technique known as meta-analysis (see Glass, 1976, for a discussion of meta-analysis). Both approaches attempt to clarify previously confusing or conflicting research findings by doing a "study of studies." Boehm (1977) and Schwab, Olian-Gottlieb, and Heneman (1979) provide examples of this general approach. Boehm investigated the frequency of single group validity as a function of the methodological soundness of studies focusing on the problem. Schwab and his colleagues investigated variance accounted for in expectancy valence research as a function of various design features employed in past studies.

Although the mechanics of the Schmidt and Hunter procedure appear formidable, the concept is quite simple. If, for example, 50 validity coefficients were available that related scores on some predictor to scores on some criterion and the predictors and criteria were essentially similar across studies, the researcher would compute the variance of this distribution of 50 studies and subtract variance due to statistical artifacts. If residual variance is found to be negligible, validity generalization would no longer be a problem. Any variance that remains can be interpreted as evidence of true situational variance. The extension of this statistical approach to validity generalization on topics other than selection research, however, has yet to be attempted.

The purpose of the present study is to examine the Schmidt and Hunter technique in the context of attitude - behavior relationships. Of specific interest was prediction of employee absence behavior from knowledge of job satisfaction and organizational commitment. The absenteeism literature would suggest that this is an area that shares many empirical similarities with the test validation literature. Recent reviews by Muchinsky (1977) and Steers and Rhodes (1978) point to a general lack of reliable findings. Inspection

of data compiled by Rhodes and Steers (Note 1) shows that significant negative relationships between job satisfaction and absenteeism were found in 27 of 65 tests and non-significant results were found in 37 of 65 tests. Some have gone so far to state that there is no consistent relationship between job attitudes and absenteeism (Nicholson, Brown & Chadwick-Jones, 1976). It would seem reasonable to consider the possibility that the current state of absenteeism literature reflects uncontrolled statistical artifacts of the type identified by Schmidt and Hunter (1977). Rejection of the situational specificity hypothesis would have substantial implications for absenteeism research as well as for other employee attitude and employee behavior relationships.

METHOD

Overview

Data used in the present study came from an investigation of absenteeism conducted in six retail stores that were part of the same national retail sales organization. Although our distribution of attitude-behavior validities is limited to six, there are several advantages associated with use of these data over a more general review of published absenteeism research.

Pearlman et al. (1980) state that differences in criterion contamination and criterion deficiency across studies are difficult to control. The inability to remove this artifactual source of variance could confuse interpretation of the true magnitude of situational effects. It is well documented in the absenteeism literature that lack of comparability of absence measures across studies is a major problem (Muchinsky, 1977; Smulders, 1980). Based on this, we chose to limit our analysis to six replications where greater con-

trol of criterion measures could be obtained. Use of such data also removes a second statistical artifact from consideration as a source of error. Because the same measures of job satisfaction and organizational commitment were used, any differences between factor structures would be slight compared to differences that occur when non-identical selection tests are used to measure the same ability construct. Schmidt and Hunter have not been able to control for these two sources of error variance in their research. We believe the present design controls these artifacts and provides a better test of the situational specificity hypothesis than possible if published research were used as a data source.

Some may object to the use of only six replications. Pearlman et al. (1980) point out, however, that there is no theoretical basis from the Bayesian perspective for setting a limit as to the minimum number of coefficients that are necessary. Bayesian priors are weighted by information value, which is a function of distribution variance and not distribution size. Pearlman et al. (1980) report analyses where the number of validity coefficients ranged from eight to 158.

Subjects and Procedure

Attitudinal and demographic data were collected from 242 retail sales employees in six geographically separated stores that belonged to the same national retail sales organization. Approximately 50 employees were selected from each store using a stratified random sampling procedure. Complete data were available from 242 employees who agreed to participate. The sample was similar to the population of employees in the stores. Average age was 36.8 years, average tenure was 6.4 years, 33% were males, 50% of the sample were employed as full-time employees, and the remainder were employed as regular

part-time employees. One way ANOVA's with store as the independent variable showed no evidence of reliable differences among stores on these four demographic variables.

Employees were given paid release time from work to participate in the project. Completion of the survey, with personal identification so that responses could be matched with absenteeism, was voluntary. Satisfaction was measured with the Job Descriptive Index (Smith, Kendall & Hulin, 1969) and organizational commitment was measured with Porter's commitment scale (Mowday, Steers & Porter, 1979).

Personnel department staff in each store recorded daily absences for 11 consecutive weeks. It was not possible to assess absenteeism for a longer period although this would have been desirable. Only unpaid absences were used for analysis as the frequency of paid absences was too low for meaningful tests. Three measures of unpaid absences were computed following the work of Nicholson et al. (1976) and Smulders (1980). These measures were the total number of days absent, the total number of one or two day absences, and the total number of occasions a person was absent regardless of the length of absence. The three measures were intercorrelated in the .90's. Analysis was limited to the total number of days lost measure because this index had the highest mean and largest standard deviation.

Validity Generalization

The estimation techniques reported by Pearlman et al. (1980) were used to compute proportions of variance attributable to the artifactual sources of sampling error, criterion unreliability, predictor unreliability, and restriction of range. Our data base provided experimental control of artifacts related to differences in criterion contamination and predictor factor structure. We made the following

assumptions. The best estimates of the "true" test-retest reliabilities for the JDI scales were based on data reported by McCabe, Dalession, Briga and Sasaki (1980) in a study using retail sales employees as subjects. The reliabilities obtained over a six week period were: Pay = .76; Promotions = .70; Work = .75; Co-workers = .68; and Supervision = .66. The best estimates of the "true" standard deviations for the JDI scales were based on data reported by Smith et al. (1969) in the development of the JDI. Manufacturing employees in 21 different plants were respondents. The standard deviations were: Pay = 14.32; Promotions = 15.22; Work = 10.39; Co-workers = 10.14; and Supervision = 10.45. The best estimate of the "true" test-retest reliability for the commitment scale was based on data reported by Mowday et al. (1979) in a study of retail sales employees. Test-retest reliability over a two month period was .72. The best estimate of the "true" standard deviation for the commitment scale was based on data reported by Miller (Note 2) in a study of over 1500 retail sales employees. The standard deviation for the total scale score was 9.04.

RESULTS

Our data analyses will be presented in two sections. First we will demonstrate that statistically significant differences did exist across the six retail stores. It is important that situational effects be observed to examine the validity of the situational specificity hypothesis. Next, we will present results obtained when the Schmidt and Hunter (1977) validity generalization procedure, as outlined in Pearlman et al. (1980), was applied to the data. Although this procedure could produce overestimation of true validity variance, the magnitude of the inaccuracy is probably inconsequential (Callender & Osburn, 1980).

Situational specificity was investigated through computation of means, standard deviations, validities, and reliabilities for all variables across the six stores. Table 1 shows that significant mean differences were found

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Insert Table 1 About Here
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for satisfaction with work, pay, and promotion and for average number of unpaid days absent. Results for satisfaction with co-workers and organizational commitment approached conventional levels of statistical significance ($p < .10$). Examination of store means indicates a strong tendency for the store with the highest absenteeism rate to also have the lowest employee attitude ratings. There was less of a tendency for the store with the lowest absenteeism rate to have the highest employee attitude ratings.

The assumption of homogeneity of variance across stores also was examined. Hartley's F_{max} statistic (Weiner, 1971) provides a simple but adequate test. Significant departures from homogeneity were found for satisfaction with work, satisfaction with supervision, and absenteeism ($p < .05$). Violation of the homogeneity of variance assumption in combination with unequal sample sizes can bias the F statistic. With these data it would most likely introduce a slight increase in Type I error (Weiner, 1971, pp. 205-210). This bias is offset, however, in noting that all significant mean differences were at the .01 level of significance. We conclude from examination of Table 1 that differences did exist across the six stores.

More important to the Schmidt and Hunter procedure is demonstration of differential validities and reliabilities. These data are presented in Table 2.

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Inspection of the table suggests that different interpretations could be drawn depending on which store is considered. For store 1 we might conclude that satisfaction with pay is the only reliable predictor of unpaid absenteeism. Results for store 2 would indicate that satisfaction with work and organizational commitment predict absenteeism. Satisfaction with co-workers is the only variable that predicts absenteeism in store 3 while satisfaction with pay (see store 1) is the only variable that predicts absenteeism in store 5. None of the predictors were significantly related to absenteeism in stores 4 and 6. Two-thirds of the validity coefficients were negative in sign supporting the contention of a weak but consistent negative relationship between employee attitudes and absenteeism behavior (Locke, 1976). Selective examination of validity coefficients highlights differences in results: satisfaction with work correlates minus .43 with absenteeism in store 2 and plus .23 in store 4; satisfaction with pay correlates minus .49 with absenteeism in store 1 and plus .14 in store 4; satisfaction with co-workers correlates minus .38 with absenteeism in store 3 and plus .04 in store 6.

It also is meaningful to compare reliabilities (coefficient alpha's) across the six stores. Reliability is an estimate of systematic variance to total variance. Consequently, a simple test of differences across stores could be conducted through computation of Hartley's F_{max} statistic. Satisfaction with pay was the only attitudinal variable that produced a significant difference. This was due entirely to the low reliability found in store 5. There also was a difference in absenteeism reliabilities across the six stores. Total number of unpaid absences for odd weeks was correlated with total number of unpaid absences for even weeks. The values for stores 1 through 6 were .55, .20, .40, .62, .33, and .52. The computed F_{max} for these data was significant.

We conclude from examination of Table 2 that different predictive relationships did exist across stores. These findings could lead to the decision that satisfaction - absenteeism validities do not generalize across different stores in the same national retail sales organization and that empirical validation is required in each situation. In other words, the pattern of results is analogous to selection research and the problems of situational specificity and validity generalization as outlined by Schmidt and Hunter (1977).

The procedure provided by Pearlman et al. (1980) was followed in examination of the situational specificity hypothesis. Table 3 compares the empiri-

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cally observed standard deviations of the validity distributions with the standard deviations predicted on the basis of predictor unreliability, criterion unreliability, restriction of range, and sampling error. The ratio of predicted variance divided by observed variance indicates the percent of variance accounted for when these four artifacts are controlled. Recall that because all data were collected using identical operationalizations of predictors and of the criterion, it was not necessary to statistically control for differences in criterion contamination and deficiency and for differences in factor structures of predictors. Consequently, residual variance is attributable to differences in computational and typing errors across stores and to "true" situation effects.

Pearlman et al. (1980) suggest that the situational specificity hypothesis be rejected when 75% or more of the variance is accounted by artifacts. Using this rule of thumb, we reject the situational specificity hypotheses for satis-

faction with promotion, satisfaction with supervision and organizational commitment. We do not reject the hypothesis of situational specificity for satisfaction with work, satisfaction with pay and satisfaction with co-workers. We have adopted the 75% rule even though an argument could be made to raise this figure because we controlled six of seven artifacts whereas Schmidt and Hunter (1977) have controlled four of seven artifacts.

Our results are similar to that reported by Pearlman et al. (1980) in their study of selection test validities in clerical occupations using performance and training as criterion measures. The average amount of variance accounted for in the present study was 77%, the situational specificity hypothesis was rejected in exactly one-half of the tests, and the mean residual standard deviation was .082. Pearlman et al. (1980) reported that when performance criteria were used, the average amount of variance accounted for was 75%, the situational specificity hypothesis was rejected in exactly one-half of the tests, and the mean residual standard deviation was .069, and when training criteria were used, the figures were 70%, one-half, and .051 respectively. The results also are similar with regard to the relative importance of different artifacts. Schmidt et al. (1980) in their examination of validity for computer programmers found that sampling error accounted for an average of 87% of variance due to artifacts. The figure in our study was 94%.

Validity generalization requires that Bayesian procedures be used to estimate both the true validity and the standard deviation of the distribution of validities when criterion unreliability and range restriction are controlled. These data along with the 90% credibility values are presented at the right side of Table 3. Inspection of the credibility values shows that for one-half of the validities the 90% level is a positive correlation. Most theoretical

work would predict negative correlations between job attitudes and absenteeism. But, Pearlman et al. (1980) state that the best estimate of true validity in a new setting involving the same job and the same predictors would be the mean of the Bayesian prior, which is $\hat{\rho}$ in Table 3. The estimate of the "true" validity was -.201 for satisfaction with work, -.366 for satisfaction with pay, and -.164 for organizational commitment.

Although these validity estimates are not large, they have potential for significant impact. Schmidt, Hunter, Pearlman and Shane (1979) demonstrated that substantial gains in productivity are likely to result even when test validity is as low as .12. Following the procedure used by Mirvis and Lawler (1977), we estimate that improvement of one-half standard deviation in satisfaction with work would translate to a 24% savings in costs that result from unpaid absenteeism. A similar improvement in organizational commitment would produce a 20% savings. These figures assume a direct relationship between attitudes and behavior and a cost to the company of $30.00 for each unpaid absence. For large organizations, the cumulative impact of slight reductions in absenteeism can be substantial. If the present conditions were generalizable to a company that employs 200 sales people at each of 50 stores, the annual savings from a one-half standard deviation increase in satisfaction with work is estimated to be $122,700 per year.

DISCUSSION

Many theories of employee behavior contain attitudes as constructs. Continued use of attitudes has not always been substantiated when predictive validities with behaviors are examined. Research on job satisfaction and absenteeism is a representative example.

The present study is a beginning attempt to understand more clearly the presumed underlying relationship between employee attitudes and employee behaviors. The Schmidt and Hunter (1977) validity generalization procedure was applied to a data set that, although limited in size, would allow for a test of the situational specificity hypothesis.

The overall results were remarkably similar to that reported by Pearlman et al. (1980) and Schmidt et al. (1980). More than 50% of the variance in validities across situations was explained by situational artifacts. Satisfaction with work, pay, and co-workers were the only variables for which the situational specificity hypothesis could not be rejected. But, even in these instances, the residual standard deviations were small, and one could argue that little room exists for situational factors to operate. It would appear that one explanation for past inconsistent results in the job satisfaction - employee absenteeism literature is failure to consider statistical artifacts.

Although sizable proportions of variance were accounted for by statistical artifacts, these results could be interpreted differently. Four sources of artifacts were removed statistically and two sources of artifacts were held constant. According to Schmidt and Hunter (1977), the only sources of remaining variance would be differences in computational and typing errors and true situational variance. We have no reason to believe that computational and typing errors would account for much of the observed variance. This means that up to 46% of variance in validities for satisfaction with work, 40% of variance for satisfaction with co-workers, and 29% of variance for satisfaction with pay are results of situational factors. Even with small residual standard deviations, some might propose that nontrivial differences remain that have situational determinants.

Additional studies are required to better evaluate the situational specificity hypothesis in the context of attitudes and behaviors. This effort would be greatly facilitated if authors routinely would provide information on means, standard deviations, and reliabilities. More detailed descriptions of how variables were operationalized also would prove valuable. Muchinsky (1977) reports, for example, that only in rare instances do writers specify the type of absence measure used, the reliability of absence behavior, and the mean and standard deviation of predictors and criteria. Accumulation of such information would allow for meaningful application of Schmidt and Hunter's work to other areas. In the context of their most recent finding that substantial differences in test validities are not likely to be found across different job families when variance attributable to statistical artifacts is controlled (Schmidt, Hunter & Pearlman, 1981), it is imperative that the situational specificity hypothesis be examined in new areas.

We should consider, however, the possibility that the validity generalization approach extended to attitude - behavior relationships might not produce the same results as reported by Schmidt et al. (1981) concerning the generalizability of selection test validity coefficients. Attitude formation is affected by social environments and physical/technological environments (Smith et al., 1969). Unreliability in attitude measurement and restriction of range can occur because of situational changes in group membership (Lieberman, 1956), or increased awareness of alternatives as evidenced by research on relative deprivation (Crosby, 1976). Such situational factors would not be expected to have much impact on measures of individual skills and abilities as typically assessed with job applicants. But, the possibility that situational factors contribute to the existence of statistical artifacts implies that when we con-

trol for such things as differences in reliabilities and range restriction we might actually be controlling for differences in the situation. Thus, there only is the appearance of no situational effect.

Nicholson et al. (1976) suggest that units might develop different work group climates toward absenteeism. It would be valuable to design a study that would measure absenteeism climate across several units in addition to job satisfaction and absenteeism. If climate were to correlate with unit differences in satisfaction reliabilities, which Schmidt and Hunter (1977) would call an artifact, then there would be some evidence that situational differences are important for validity generalization.

Variation in validities attributable to sampling error has been shown to be greater than variation resulting from other artifacts (Schmidt et al., 1980). But correction for sampling error assumes random sampling. In most studies where employee attitudes have been measured the sample is not random. Non-response error and selection bias error should be considered. We might expect, for example, that employee participation could be influenced by situational factors such as trust in the organization or level of satisfaction. Consequently, application of the Schmidt and Hunter procedure to attitude - behavior relationships might be compromised by lack of random samples. Psychological research often has not considered the impact of violations of this assumption even though the consequences can be severe and are difficult to anticipate (see Jessen, 1978, pp. 16-21).

We have raised possible limitations to the Schmidt and Hunter validity generalization procedure as applied to attitude - behavior relationships. But, we strongly recommend that it be extended to this research area. Documentation of stable relationships among employee attitudes and employee behaviors would

have considerable theoretical significance. Investigation of the impact of situational factors on attitude reliability and range restriction would contribute generally to attitude theory literature. There also are practical implications, especially for organizations that employ large numbers of people in different locations. For example, attempts to improve employee work satisfaction through job redesign might be more easily justified to managers on the basis of overall expected gains as opposed to single situation effects.

The present study is a first attempt to use the Schmidt and Hunter solution for validity generalization in an area other than employee test validation. Their procedure is relevant for analysis of existing studies as well as for the design of future research.

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Footnote

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Table 1

Job Satisfaction, Commitment, and Absenteeism Across Stores

Dependent Variable	Retail Sales Unit						
	Store 1 (N=23)	Store 2 (N=41)	Store 3 (N=46)	Store 4 (N=42)	Store 5 (N=38)	Store 6 (N=38)	F (df=5,236)
JDI Work							
M	33.26	34.85	36.65	34.93	29.42	37.44	4.40*
SD	8.88	8.04	8.54	9.22	11.36	6.41	
JDI Pay							
M	28.86	33.70	27.34	26.28	21.96	30.84	14.92*
SD	6.24	7.12	6.63	7.43	6.09	6.06	
JDI Promotion							
M	23.66	28.82	25.40	22.76	19.96	24.04	4.60*
SD	9.26	9.27	8.26	8.85	8.16	8.37	
JDI Supervision							
M	42.65	43.02	43.01	40.81	41.11	44.67	0.76
SD	8.55	12.10	10.54	11.62	13.49	9.31	
JDI Co-workers							
M	41.61	43.46	43.03	44.95	38.21	42.77	1.94
SD	8.08	9.51	10.44	9.16	11.78	11.18	
Commitment							
M	58.61	63.20	62.91	61.76	57.39	61.42	2.12
SD	8.62	8.59	9.72	9.73	11.83	9.75	
Absences							
M	0.22	0.32	0.28	0.21	0.92	0.33	3.12*
SD	0.67	0.61	0.81	0.84	1.55	0.81	

* $p < .01$

Table 2

Absenteeism Validity Coefficients and Predictor Reliabilities[1]

	Retail Sales Unit					
Predictors	Store 1 (N=23)	Store 2 (N=41)	Store 3 (N=46)	Store 4 (N=42)	Store 5 (N=38)	Store 6 (N=52)
JDI Work						
Validity	-.04	-.43*	-.20	.23	-.01	-.22
Reliability	.76	.69	.71	.78	.81	.61
JDI Pay						
Validity	-.49*	-.01	-.21	.14	-.42*	-.14
Reliability	.43	.56	.46	.50	.15	.46
JDI Promotion						
Validity	-.03	-.27	-.10	.22	-.20	.08
Reliability	.90	.90	.88	.90	.87	.89
JDI Supervision						
Validity	.06	-.08	-.26	.01	.11	.12
Reliability	.82	.82	.78	.83	.83	.82
JDI Co-workers						
Validity	.18	-.15	-.38*	.17	-.21	.04
Reliability	.83	.82	.87	.89	.90	.89
Commitment						
Validity	-.10	-.40*	-.38	.16	-.07	-.16
Reliability	.80	.82	.87	.89	.90	.89

[1]Reliability was coefficient alpha

* $p < .05$

Table 3

Results for Situational Specificity and Validity Generalization[1]

Predictors	$\bar{r}$	Observed SD	Predicted SD	% of variance accounted for	Residual SD	$\hat{\rho}$	SD $\hat{\rho}$	90% c.v.
JDI Work	-.124	.207	.155	56	.138	-.201	.248	.11
JDI Pay	-.161	.203	.170	71	.110	-.366	.214	-.09
JDI Promotion	-.044	.164	.155	89	.055	-.133	.146	.05
JDI Supervision	-.012	.138	.158	100	.000	-.011	.000	-.01
JDI Co-workers	-.074	.200	.155	60	.127	-.088	.193	.16
Commitment	-.110	.170	.158	86	.063	-.164	.096	-.04

[1]For each predictor, total N=242; total number of r's=6.

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